
WETLANDS AND OTHER WATERS OF THE U.S. TECHNICAL MEMORANDUM

This page intentionally left blank



Technical Memorandum

Date: April 2015

Project: N-12 Niobrara East and West EIS

Job No. 84534

To: Project File

From: HDR

Subject: Wetlands and Other Waters of the U.S.

I. Introduction

The U.S. Army Corps of Engineers (Corps) is preparing an Environmental Impact Statement (EIS) for the proposed reconstruction of Nebraska Highway 12 (N-12) east and west of the Village of Niobrara (Niobrara), Nebraska (Project). Because the Project would impact regulated waters of the U.S. and would require a Clean Water Act Section 404 Permit, and because no other Federal action is required, the Corps is the lead Federal agency for compliance with the National Environmental Policy Act (NEPA).

The purpose of this Technical Memorandum is to characterize existing conditions and examine potential impacts of the Project and alternatives on wetlands and other waters of the U.S. The information presented in this Technical Memorandum is used to describe the existing conditions and associated impacts on alternatives carried forward for analysis in the N-12 Draft EIS. This technical memorandum has been developed prior to completion of alternative screening. Therefore, the full range of alternatives has been evaluated. Detailed information on the purpose of and need for the Project and on the alternatives carried forward for analysis is provided in the N-12 Draft EIS. The range of alternatives evaluated in this technical memorandum are¹:

- No Action – Section 404 permit denied; new roadway not constructed
- Alternative A1 – Elevation raise on the existing N-12 alignment
- Alternative A2 – Elevation raise parallel to the existing N-12 alignment
- Alternative A3 – New roadway along the base of the Missouri River bluffs
- Alternative A4 – Same alignment as Alternative A2 but with 3.6 miles of bridges
- Alternative A7 – Same alignment as Alternative A3 but with 1.8 miles of bridges
- Alternative B1 – New roadway along the top of the Missouri River bluffs

¹ Alternatives A5 and A6 were developed as part of the bridge alternative refinement process. They were iterations of the same concept, that is, an elevated roadway following Alternative A2 alignment and Alternative A3 alignment. Due to various factors, these alternatives were not advanced. Alternatives A4 and A7 represent the elevated roadway alternatives on the Alternative A2 and Alternative A3 alignments. In addition, Alternative B2 (south of Bluffs) was eliminated from detailed analysis because it has no distinct advantages or distinguishing features from those of Alternative B1 and the east segment of B2 was determined not logistically practicable.

II. Regulatory Background

The following sections discuss the relevant Federal and state regulations regarding wetlands and waters of the U.S.

A. Relevant Federal Directives

Section 404 of the Clean Water Act

Under Section 404 of the Clean Water Act (33 United States Code [USC] 1344), the Project must comply with the Section 404(b)(1) Guidelines. Fundamental to the Section 404(b)(1) Guidelines is “the precept that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge would not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern” (40 Code of Federal Regulations [CFR] 230.1(c)). Specifically related to alternatives, the Corps can only authorize the least environmentally damaging practicable alternative (LEDPA) (40 CFR 230.10(a)), unless the other alternatives have unacceptable environmental impacts. To determine the LEDPA, the Corps must identify the practicable alternative that would have the least adverse impact on the aquatic ecosystem and no other significant adverse environmental consequences. The Corps also follows 33 CFR 320-330 for the special policies, practices, and procedures to be followed in connection with the review of applications for Department of the Army permits pursuant to Section 404 of the Clean Water Act.

Executive Order 11990, Protection of Wetlands

Executive Order 11990 (42 Federal Register [FR] 26961) directs agencies to “avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.”

Presidential Wetland Policy

The George H.W. Bush administration instituted a “no-net-loss” wetland policy in January 1989. Its short term goal was to achieve no overall loss of wetlands with a longer term goal of achieving a net gain of the nation’s wetlands, including an improvement in the functions and values of those wetlands. In 1993, the Clinton administration released and expanded its wetland policy. The vehicles by which the Clinton administration would meet this goal included enforcement of avoidance under of the Section 404 permit program, enforcement of the Swampbuster program, and increased economic assistance to the Wetlands Reserve Program for farmers. The

George W. Bush administration reaffirmed that commitment in 2003. The Obama administration has not yet released its policy.

B. Relevant State Directives

The Nebraska Department of Environmental Quality (NDEQ) is responsible for Clean Water Act Section 401 Water Quality Certification for any project requiring a Federal permit or license that includes a discharge into a water of the state. As authorized under Section 401, the NDEQ has the authority to regulate surface water quality standards (in accordance with Nebraska Administrative Code Title 117: Nebraska Surface Water Quality Standards) for all activities that have the potential to degrade waters of the State, regardless of Federal jurisdiction or permitting authority (NDEQ 2009).

III. Affected Environment

A. Study Area

The Study Area for wetlands and waters of the U.S. extends west to the town of Verdel, Nebraska, and east to the intersection of N-12 and County Road 531. The Study Area extends approximately 400 feet north of the current alignment of N-12 and approximately 500 feet south of the bluffs alignment. For purposes of assessing existing waters of the U.S., the permanent impact area for each alternative was used. The design sheets showing wetland and waters of the U.S. impacts can be provided upon request.

B. Wetlands

Wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328). The presence or absence of wetlands in the Study Area was determined by Alfred Benesch and Company through a wetland delineation in 2009 (Alfred Benesch and Company 2014). A determination has not been made as to the jurisdictional status of wetlands under Section 404 of the Clean Water Act.

Wetlands in the Study Area were found to consist of palustrine systems. Palustrine wetland systems include all nontidal wetlands dominated by trees, shrubs, persistent emergents, and emergent mosses and lichens. Palustrine wetland systems are generally bounded by uplands or by any other type of wetland system (Cowardin et al. 1979). Four wetland classes within the palustrine system are present in the Study Area: emergent, scrub-shrub, forested, and unconsolidated bottom. Definitions of the wetland classes are as follows (Cowardin et al. 1979):

- Palustrine emergent (PEM) – Characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. Emergent wetlands are commonly called marshes, wet meadows, and sloughs.
- Palustrine scrub-shrub (PSS) – Characterized by woody vegetation less than 20 feet tall. Scrub-shrub wetlands may represent a successional stage leading to a forested wetland or may be a stable community. Scrub-shrub wetlands are also known as shrub swamps and bogs.
- Palustrine forested (PFO) – Characterized by broad-leaved deciduous woody vegetation that is 20 feet or taller. Forested wetlands include riparian, or streamside, areas adjacent to creeks, rivers, and other surface waterbodies.
- Palustrine unconsolidated bottom (PUB) – Characterized by the lack of large stable surfaces for plant and animal attachment. Unconsolidated bottoms, also referred to in this document as Open Water areas, include all wetland and deepwater habitats with vegetative cover of less than 30 percent.

Each wetland system is also characterized by its hydrologic regime. The hydrologic regime is the duration of ponding or the period during which soil is saturated within 12 inches of the soil surface. The hydrologic regimes of wetlands in the Study Area that lie within the Missouri River floodplain range among the following (Cowardin et al. 1979):

- Temporarily flooded (Hydrology Modifier “A”) – Surface water is present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season. Plants that grow both in uplands and wetlands are characteristic of the temporarily flooded regime.
- Seasonally flooded (Hydrology Modifier “C”) – Surface water is present for extended periods, especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the ground surface.
- Semi-permanently flooded (Hydrology Modifier “F”) – Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the ground surface.
- Intermittently exposed (Hydrology Modifier “G”) – Water covers the ground surface throughout the year except in years of extreme drought. Vegetation is composed of obligate hydrophytes.

Large portions of the Study Area within the Missouri River floodplain consist of palustrine emergent semi-permanently flooded wetlands (PEMF) and palustrine emergent seasonally flooded wetlands (PEMC) that have formed in the Missouri River and the tailwaters of Lewis and Clark Lake. These monotypic emergent wetlands are continuously expanding due to sediment deposition from the Niobrara River and the expansion of the Lewis and Clark Lake delta. It is estimated that the Lewis and Clark Lake delta near Springfield, South Dakota, expands 550 feet per year and creates between 190 and 210 acres of wetland per year (Corps 2011).

Outside of the Missouri River floodplain, wetlands are less prevalent; however, wetland areas do occur within the natural drainageways located in the bluffs. These wetlands

generally are not exposed to the same level of hydrology as those in the floodplain; therefore, they are generally classified as palustrine emergent temporarily flooded wetlands (PEMA). Wetlands identified in the bluffs also consist of palustrine forested temporarily flooded wetlands (PFOA) and palustrine unconsolidated bottom wetlands (PUB). Few areas in the bluffs consist of PEMC. Based on the wetland determination conducted by NDOR in October 2007, the wetlands along the smaller tributaries and in the bluffs drainageways generally exhibit more vegetative species diversity than the wetlands in the Missouri River floodplain.

Each wetland identified during the wetland determination process was evaluated to ascertain whether it is unique or exceptionally functional using the Floristic Quality Index. The Floristic Quality Index is used to assign a coefficient of conservatism (C), which is a value from 0 to 10 (10 being the highest) that represents the probability that each vegetative species is likely to occur in natural, undisturbed locations. The Floristic Quality Index evaluation determined that no unique or exceptionally functional wetlands exist in the Study Area. Furthermore, no species was observed that exceeded a value of 5 (a species that persists under moderate disturbance). In addition, a Project-specific analysis of regionally unique systems (fens, bogs, springs, and playa wetlands) also yielded no findings (NDOR 2009b).

Wetland Trends

Portions of the Study Area within the Missouri River floodplain (Alternatives A1, A2, A3, A4, and A7) contain an abundance of monotypic PEM wetlands. Emergent wetlands of this kind are continuously expanding or migrating due to the documented growth of the Lewis and Clark Lake delta and Niobrara River delta (Corps 2011). Growth of the two deltas, and consequently the growth of wetlands, can be attributed to sediment deposition and the unique features of the Lewis and Clark Lake delta. This section elaborates on the trend of wetland development associated with sediment deposition and the subsequent growth of the aforementioned deltas. Given the limited number of wetlands within the Alternative B1 Study Area and the lack of sufficient data to support wetland growth, this section focuses on the trend of wetland development within the Missouri River floodplain.

Sediment deposition and delta growth near the Study Area began in 1955 with construction of the Gavins Point Dam and the ensuing development of Lewis and Clark Lake. This reservoir acts as a catchment basin for sediment loads carried by the Missouri River. The Missouri River receives sediment from several sources, including tributaries, small drainages, Missouri River bed scour below Fort Randall Dam, and bank erosion along the Missouri River and in Lewis and Clark Lake (Corps 2011). The Niobrara River is the greatest contributor of sediment into the Missouri River and subsequently into Lewis and Clark Lake, supplying about 55 percent of the total sediment inflow (Corps 2011).

The continuous transport of sediment into Lewis and Clark Lake decreases the storage capacity of the reservoir and promotes development of the Lewis and Clark Lake delta.

When comparing sediment deposition of the six mainstem reservoirs of the Missouri River (Fort Peck Lake, Lake Sakakawea, Lake Oahe, Lake Sharpe, Lake Francis Case, and Lewis and Clark Lake), which store approximately 3.7 million acre-feet (or about 6 trillion tons) of sediment, the greatest loss of storage in terms of percentage reduction occurs in Lewis and Clark Lake (National Research Council 2011). The Corps reported that between 1955 and 2007, the Gavins Point Dam project lost approximately 125,000 acre-feet, or 21.7 percent of the original volume (Corps 2011). As the storage capacity of Lewis and Clark Lake decreases, the contribution of sediment from the Missouri and Niobrara Rivers results in formation of a delta that extends from near Verdel, Nebraska, to about 3 miles downstream of Springfield, South Dakota (Corps 2004). The delta that has formed at the mouth of the Niobrara River is a result of the lack of large flood flows to transport sediment downstream. It is estimated that the Lewis and Clark Lake delta near Springfield, South Dakota, migrates downstream approximately 550 feet per year (Corps 2011).

Growth of the Lewis and Clark Lake delta is the result of sediment deposition, but the establishment of hydrophytic vegetation and creation of wetlands is, in part, the result of unique features that characterize Lewis and Clark Lake and the lake delta. As compared to the other mainstem reservoirs, Lewis and Clark Lake is unique in its stable pool elevation, which rarely fluctuates more than 2 feet per year (Corps 2011). This pool stability allows sediment carried in by the Missouri River to continuously settle above Gavins Point Dam, resulting in development of the delta, establishment of hydrophytic vegetation, and, consequently, the creation of wetlands. Another feature of the Lewis and Clark Lake delta is the numerous backwaters, ponds, and chutes that support additional areas for establishment of hydrophytes and, thus, emergent wetlands (Corps 2004). The stability of the Lewis and Clark Lake pool elevation and the existence of backwater systems together promote the vast development of emergent wetlands.

In a recent reconnaissance assessment completed by the Corps, it was estimated that the sedimentation in Lewis and Clark Lake, and the associated trend of delta growth, has created approximately 11,500 acres of wetlands (Corps 2011). It should be noted that the 11,500 acres consist of 10 to 20 percent open water. The areas designated as open water can be described as a combination of PEMF, PUBF, and PUBH wetlands. This vast expanse of wetland formation began in 1955 with the construction of Gavins Point Dam, and it is estimated that on average between 190 and 210 acres of wetland are created per year as a result of deposition into Lewis and Clark Lake (Corps 2011).

C. Waterways

For purposes of this discussion, waterways include rivers, perennial streams, and intermittent streams. According to current Clean Water Act jurisdictional guidance, a waterway is subject to Clean Water Act jurisdiction if the waterway is any of the following (EPA and Corps 2008):

- A traditional navigable water, which would include all the waters described in 33 CFR 328.3(a)(1) and 40 CFR 230.3(s)(1)

- A non-navigable, relatively permanent tributary of a traditional navigable water, where the tributary typically flows year-round or has continuous flow at least seasonally (typically three months)
- A non-navigable tributary that is not relatively permanent but does contain a significant nexus toward benefiting the chemical, physical, and/or biological integrity of downstream traditional navigable waters

Waterways in the Study Area were determined by identifying perennial and intermittent waterways on USGS 7.5-minute quadrangle topographic maps and aerial photography and during field observations. The Missouri River, Ponca Creek, Harry Miller Creek, Medicine Creek, Bazile Creek, and several small intermittent waterways (primarily tributaries to the aforementioned surface waters) in the Study Area would be jurisdictional under the Clean Water Act.

D. Lakes, Ponds, Impoundments

Generally, lakes, ponds, and impoundments are subject to Corps jurisdiction, provided that the waterbody is susceptible to interstate or foreign commerce (33 CFR 328). The only waterbody of this kind in the Study Area is the tailwaters of Lewis and Clark Lake. Several small stock ponds, consisting of impoundments along tributaries, exist in the Study Area. As these stock ponds are not susceptible to interstate or foreign commerce, their jurisdictionality with regard to the Clean Water Act would be addressed on a case-by-case basis and would likely be directly tied to the jurisdictional determination applied to the corresponding tributary.

IV. Methodology of Impact Analysis

A. History of Wetland Identification

The presence of wetlands, waterways, and other waters of the U.S. was first determined from wetland determinations completed by NDOR in 2007 (NDOR 2009a). NDOR wetland data applied to the following three general alignments: On Alignment or Parallel Alignment; Base of Bluffs Alignment; Bluffs Alignment. NDOR did not evaluate wetlands in association with the South of Bluffs Alignment. Wetland determinations made by NDOR were field verified by HDR on September 29 and 30, 2008. Provided in Attachment A is the Wetland Field Verification and Other Resource Field Documentation Technical Memorandum that describes the methodology and results of the field survey. In an effort to more accurately describe the location and size of wetlands and waterways, the action alternative corridors were delineated by Alfred Benesch and Company in 2009 (Alfred Benesch and Company 2014). The Alfred Benesch wetland delineation was reviewed and verified by the Corps in 2014 (Corps 2014).

B. Impact Calculations

Wetlands

The permanent impact area reflects activities associated with the Project that would remain after Project completion and any wetlands within the permanent impact area were determined to be permanently impacted. The impacts on the original condition would be permanent. Impacts were calculated for the east and west segment of each action alternative. The Project would also include temporary limits of construction, which would include activities associated with the Project that would be removed before Project completion. The temporarily impacted areas would be restored to as close to original conditions as possible. Temporary impacts on wetlands and waterways are presented in the N-12 Draft EIS, Section 4.14, Construction.

Wetlands identified within the permanent impact area were grouped into six classifications based on Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979). The six wetland classifications are as follows:

- PUBG (Open Water) – This classification has been labeled as Open Water and consists of wetlands that area classified as palustrine unconsolidated bottom intermittently exposed.
- PEMA – This classification represents a palustrine emergent temporarily flooded wetland. More generally, PEMA wetlands are dominated by herbaceous vegetation that is adapted to growing in both saturated and upland soils, such as reed canarygrass (*Phalaris arundinacea*).
- PEMC – Wetlands identified as PEMC are dominated by emergent vegetation and display a seasonally flooded hydrologic regime. This classification of wetland is similar to PEMA but often displays vegetation that is more suited for extended periods of saturation.
- PEMF – This classification of wetland is similar to the two previously listed wetland classifications in that it describes a palustrine system that is dominated by emergent vegetation. However, unlike PEMA and PEMC, this classification describes wetlands that are semi-permanently flooded, with surface water present throughout the growing season. More generally, the PEMF wetlands identified in the Study Area were commonly found adjacent to open water and consist of vegetation adapted to long periods of inundation, such as cattail (*Typha latifolia*).
- PSSA – This classification represents a palustrine system that is dominated by scrub-shrub vegetation and a temporarily flooded hydrologic regime. The shrub stratum includes woody plants that are less than 20 feet tall (Cowardin et al. 1979). The categorization of a scrub-shrub wetland requires that the shrub layer have an areal coverage of 30 percent or more and that the shrub layer constitute the uppermost layer of vegetation (Cowardin et al. 1979).
- PFOA – This classification is described as a palustrine system that is dominated by forested vegetation and a temporarily flooded hydrologic regime. The

distinction between a forested and shrub wetland is that the forested layer (woody vegetation that is 20 feet or taller) displays an areal coverage of 30 percent or more and is the uppermost layer of vegetation (Cowardin et al.1979).

Waterways

Impacts on waterways were determined from the permanent impact area and are categorized into two types of impact: stream channel loss and impact on stream channel. Stream channel loss would include such activities as construction of a culvert pipe or box culvert that would straighten a meandering channel. The linear feet of stream channel loss is calculated by subtracting the original length of the stream channel by the length of the culvert pipe or box culvert. The impacts on stream channels include construction activities such as the limits of excavation required for new culverts, culvert cleanouts, bridges, and channel grading under bridges.

C. Impact Thresholds

Wetlands

Impacts on wetlands were classified into threshold categories, the lower limits of which are based on acreage thresholds of the Corps' permitting program and the upper limits of which are based on the amount of wetland impacts the Corps has permitted in the past. Permanent impacts were classified into the following impacts threshold categories:

- Negligible – Wetlands and other waters of the U.S. would not be directly impacted, or less than 0.5 acre would be permanently impacted.
- Minor – Between 0.5 and 5 acres of wetlands would be permanently impacted.
- Moderate – Between 5 and 20 acres of wetlands would be permanently impacted.
- Major – More than 20 acres of wetlands would be permanently impacted.

Waterways

Impacts on waterways were classified into threshold categories, the lower limits of which are based on the 2012 State of Nebraska regional conditions for nationwide permits and the upper limits of which are based on the amount of waterway impacts the Corps has permitted in the past. For each threshold category, impacts on waterways include stream channel loss and stream channel impact. Permanent impacts were classified into the following impacts threshold categories:

- Negligible – Waterways would not be directly affected, or less than 100 linear feet of stream channel would be lost, and less than 300 linear feet of stream channel would be impacted.
- Minor – Between 100 and 200 linear feet of channel would be lost, and between 300 and 400 linear feet of channel would be impacted.
- Moderate – Between 200 and 300 linear feet of channel would be lost, and between 400 and 500 linear feet of channel would be impacted.

- Major – More than 300 linear feet of channel would be lost, and more than 500 linear feet of channel would be impacted.

V. Impact Analysis for Alternatives

The following section describes the impacts on wetlands and waterways that would result from the No Action Alternative and the six action alternatives. Summary of wetland and waterway impacts are provided in Tables 1 and 2 and the design sheets showing wetland and waters of the U.S. impacts can be provided upon request.

A. No-Action Alternative

Wetlands

The No-Action Alternative would not affect wetlands or other waters of the U.S. because no new roadway would be constructed. Reasonably foreseeable future road improvement projects would need to occur along N-12 as siltation continues and flooding of the roadway is expected to persist. These future road improvement projects may impact existing wetlands and other waters of the U.S. Wetlands would likely continue to develop and expand in the floodplain due to sediment deposition and rising groundwater levels in the area.

Waterways

The No-Action Alternative would not affect waterways because no new roadway would be constructed. Reasonably foreseeable future road improvement projects would need to occur along N-12 as siltation continues and flooding of the roadway is expected to persist. These future road improvement projects may impact existing waterways.

B. Action Alternatives

Wetlands

The direct impacts on palustrine wetlands that would result from each alternative, calculated for the east and west segment of each alternative, are shown in Table 1. It is assumed that all wetlands within the permanent impact area would be affected. The estimated acreage of wetlands affected is based on a wetland determination. The Project would also include borrow sites and disposal sites, although quantities of borrow material and refuse for disposal are currently unknown.

Waterways

The direct impacts on waterways that would result from each action alternative, by segment, are shown in Table 2. Impacts on waterways would result from the removal and installation of culverts and bridges. Impacts are categorized as channel loss or gain

and channel impact. The estimated linear feet of waterways affected are based on a wetland and stream channel determination.

C. Floodplain Alternatives

Wetlands

Each of the five floodplain alternatives would have a “major” impact on wetlands, with each alternative impacting more than 20 acres. Alternative A2 would have the greatest impact on monotypic PEM communities in the floodplain (see Table 1).

Despite these impacts, rising groundwater levels and continued siltation of the Missouri River would likely develop additional wetlands in other areas over time. Because these floodplain wetland complexes are extremely large in area and poor in plant diversity and quality, the impacts on the floodplain wetlands under the floodplain alternatives would be considered “minor” because they are not impacting the overall wetland functions of the floodplain.

Waterways

The five floodplain alternatives would have a “major” impact on waterways, with each alternative resulting in more than 500 feet of channel impact. However, only Alternative A1 would result in a loss of stream channel (39 feet); the other floodplain alternatives would result in net gain of channel.

D. Bluffs Alternative

Wetlands

Alternative B1 would have a “major” impact on wetlands, with impacts totaling approximately 20.7 acres. Although Alternative B1 would impact the least amount of wetlands, when considering all action alternatives, the wetlands located along Alternative B1 are located at a higher elevation with greater vegetative diversity.

Waterways

Alternative B1 would have a “major” impact on waterways. When considering the six action alternatives, Alternative B1 would result in the largest amount of channel impact (6,078 linear feet). However, Alternative B1 would only result in 10 feet of channel loss.

This page intentionally left blank

Table 1.
Permanent Impacts on Wetlands and Open Water

Wetland Type ¹	Alternative A1 (acres)		Alternative A2 (acres)		Alternative A3 (acres)		Alternative A4 (acres)		Alternative A7 (acres)		Alternative B1 (acres)	
	West	East	West	East	West	East	West	East	West	East	West	East
PEMA	12.07	21.14	19.96	18.64	13.73	21.01	16.43	16.72	13.65	19.12	1.53	10.13
PEMC	4.78	13.61	3.45	14.86	3.72	13.89	3.20	9.62	3.71	9.80	1.57	3.45
PEMF	37.90	23.20	36.99	25.10	33.76	15.78	16.40	14.08	24.41	9.96	0.00	1.84
PSSA	0.25	0.47	0.09	0.67	0.00	0.65	0.00	0.66	0.00	0.65	0.00	0.61
PFOA	0.00	4.12	0.00	3.64	0.21	4.09	0.00	3.64	0.21	4.19	0.00	0.49
PUBG (Open Water)	16.81	13.07	10.52	8.37	6.03	9.39	5.17	2.67	2.84	2.31	1.00	0.04
Total Wetlands	71.81	75.61	71.01	71.28	57.45	64.81	41.20	47.39	44.82	46.03	4.10	16.56
	147.42		142.29		122.26		88.59		90.85		20.66	

Source: Alfred Benesch and Company 2015

Notes:¹PEMA = Palustrine Emergent Temporarily Flooded; PEMC = Palustrine Emergent Seasonally Flooded; PEMF = Palustrine Emergent Semi-permanently Flooded; PSSA = Palustrine Scrub-Shrub Temporarily Flooded; PFOA = Palustrine Forested Temporarily Flooded; PUBG = Palustrine Unconsolidated Bottom Intermittently Flooded

Table 2.
Permanent Impacts on Waterways

Alternative A1 (linear feet)		Alternative A2 (linear feet)		Alternative A3 (linear feet)		Alternative A4 (linear feet)		Alternative A7 (linear feet)		Alternative B1 (linear feet)	
Channel Loss/Gain	Channel Impact	Channel Loss/Gain	Channel Impact	Channel Loss/Gain	Channel Impact	Channel Loss/Gain	Channel Impact	Channel Loss/Gain	Channel Impact	Channel Loss/Gain	Channel Impact
-39	1,969	+46	2,741	+155	2,763	+134	2,736	+206	2,763	-10	6,078

Source: Alfred Benesch and Company 2015

This page intentionally left blank

VI. References

- 33 CFR 328. Navigation and Navigable Waters. Definition of waters of the United States.
- 40 CFR 230.1(c). Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material. Purpose and policy.
- 42 FR 26961. May 24, 1977. Executive Order 11990, Protection of Wetlands.
- Alfred Benesch and Company. 2014. *Wetland Investigation Field Report for Niobrara East and West, Revision 2*. Prepared for NDOR. August.
- . 2015. Email message from Patrick Kastl, Alfred Benesch and Company to Matt Pillard, HDR, new wetland and waterway impact calculations. April 7.
- Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. U.S. Department of the Interior, Washington D.C.
- National Research Council. 2011. *Missouri River Planning: Recognizing and Incorporating Sediment Management*. Washington, DC: The National Academies Press.
- Nebraska Department of Environmental Quality (NDEQ). 2009. Title 117, Nebraska Surface Water Quality Standards. March 22.
[http://www.deq.state.ne.us/RuleAndR.nsf/23e5e39594c064ee852564ae004fa010/9f07eae313ae56d686256888005bc61e/\\$FILE/Title%20117_2012.pdf](http://www.deq.state.ne.us/RuleAndR.nsf/23e5e39594c064ee852564ae004fa010/9f07eae313ae56d686256888005bc61e/$FILE/Title%20117_2012.pdf).
- Nebraska Department of Roads (NDOR). 2009a. Email message from Wyatt Webster, Highway Environmental Biologist, NDOR, to Matt Pillard, HDR, regarding Niobrara Updated Wetland Files. August 5.
- . 2009b. Letter from Wyatt Webster, Highway Environmental Biologist, NDOR, to Matt Pillard, HDR, regarding unique and functionally special wetlands. March 12.
- U.S. Army Corps of Engineers (Corps). 2004. *Gavins Point Dam/Lewis and Clark Lake Master Plan Update*. U.S. Army Corps of Engineers, Omaha District, Omaha, Nebraska. December.
- . 2011. *Lewis and Clark Lake, History of Delta Growth Reconnaissance Assessment*. U.S. Army Corps of Engineers, Omaha District. July.
- . 2014. Email message from Rebecca Latka, USACE, to Tony Ringenberg, NDOR, regarding acceptance of Wetland Delineation for N-12 EIS. October 23.
- U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (Corps). 2008. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* and *Carabell v. United States*. December 2.
http://www.epa.gov/owow/wetlands/pdf/CWA_Jurisdiction_Following_Rapanos120208.pdf.

This page intentionally left blank

ATTACHMENT A

WETLAND FIELD VERIFICATION AND OTHER RESOURCE FIELD DOCUMENTATION

This page intentionally left blank

Attention: Mr. Len Sand	Date: January 27, 2009	Job No: CN 31674
To: Nebraska Dept of Roads	Phone:	

Regarding: **N-12 Niobrara East and West Wetland Field Verification and Other Resource Field Documentation**

We are sending you: ☒ **Attached** ☐ Under separate cover via _____ the following items

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☒ Copy of Memo ☐ Change Order ☐ Other _____

Copies	Date	No.	Description
1	12-19-08		N-12 Niobrara East and West Wetland Field Verification and Other Resource Field Documentation

Remarks **Len:**

Please find the attached memo for the N-12, Niobrara East and West Project. The memo represents HDR's verification of wetland resources as provided by NDOR, HDR's assessment of existing land use, and review of listed recognized environmental conditions as provided by EDR.

Regarding the wetland verification, in addition to reviewing the results of the verification, the following items would be beneficial for future use and review of wetland information:

1. Closed wetland polygons for all provided wetland areas currently consisting of open-ended wetland lines.
2. Boundaries of the survey area used by NDOR during initial Project wetland determinations.

These items were discussed with USACE, and these items in combination would provide USACE a better understanding of existing wetland type and location, areas investigated, and areas that may require additional analysis.

If you have any questions regarding the submittal or the requested information, please do not hesitate to contact USACE or HDR.

Copy to **Mr. Matt Wray – USACE (402) 896-0997** Signed **Mr. Matt Pillard – HDR (402) 399-1186**

If enclosures are not as noted, please notify us at once

N:\Users\Gail\Stationery & Forms\Forms\Transmittal.doc

To: USACE, HDR File	
From: M. Pillard, Q. Damgaard	Project: N-12 – Niobrara East and West
CC: NDOR	
Date: December 19, 2008	Job No: 84534

RE: Wetland Field Verification and Other Resource Field Documentation

HDR Engineering, Inc. (HDR) performed fieldwork on September 29 and 30, 2008, in support of the pending Environmental Impact Statement (EIS) for the Nebraska Highway 12 (N-12) Niobrara East and West Project (Project). During this fieldwork, HDR verified wetlands formerly determined by the Nebraska Department of Roads (NDOR), land use, and areas with recognized environmental conditions (RECs). The following describes the methodologies used during the fieldwork and presents the resulting findings.

Wetlands and Waters of the U.S.

Methodology

Prior to fieldwork activities, HDR obtained wetland determination data (66 wetland areas) collected by NDOR in 2007. The NDOR wetland data applied to the following three general alignments: On Alignment or Parallel Alignment; Base of Bluffs Alignment; Bluffs Alignment. NDOR did not evaluate wetlands in association with the South of Bluffs Alignment. HDR also obtained and overlaid National Wetlands Inventory (NWI) data (131 wetland areas) on the NDOR determination data; the boundaries of the NWI data were clipped to the alignment corridors. The resulting maps contained all necessary wetland information on an aerial photography background that could be used during field verification and new wetland determination activities.

In efforts to document field verification observations and previously unanalyzed wetland determination findings, HDR utilized a “wetland verification checklist” that HDR previously developed for use on this Project. Using the checklist, and the developed maps, HDR documented the following attributes of NDOR-determined and NWI-mapped wetlands that were easily accessible from existing public roads:

- Presence or absence of the mapped wetland
- Size of the mapped wetland area compared to actual on-the-ground observations
- Mapped wetland type vs. observed wetland type (Cowardin Classification)
- Dominant vegetation
- Photo number

Ground-level site photography was taken in locations where field verification observations differed from previously-recorded NDOR data and at all areas that had not been previously evaluated. Photos for areas not previously evaluated are provided as Photos 1 through 16 in Appendix A.

No wetlands were analyzed that were not easily accessible from existing public roads. No sub-surface analysis for either hydric soil indicators or sub-surface hydrology was performed. Analysis was restricted to visual observations of vegetation and surface hydrology. Wetland boundaries were either confirmed or modified via notes on aerial photography. No wetland boundaries were mapped using the Global Positioning System (GPS).

Findings

HDR verified 74 NDOR-determined wetlands and 17 NWI polygons. Generally, HDR confirmed NDOR findings. With few exceptions, HDR confirmed NDOR data regarding whether a wetland was present and the size and shape of the wetland. More discrepancies were noted with regard to wetland type: wetland class was generally confirmed, but multiple discrepancies were noted with regard to the water regime modifier. Generally, HDR felt areas within the Missouri River floodplain were wetter than the “seasonally flooded” water regime modifier applied by NDOR to the majority of these wetland areas.

Details of the findings are provided in Table 1: Wetland Field Verification and Figures 1 through 10.

Land Use

Methodology

HDR visually observed and documented general land uses along the Project alignments. Observations were made from existing county or state right-of-way. The observed land uses were documented on field maps, and in some cases, photo documentation was also applied.

Findings

Generally, areas that are not wetlands, and occur along the alignments within the Missouri River floodplain, consist of hay fields. Along bluffs alignment, the more prevalent land use is pasture. Specific land uses are shown in Figures 11 and 12 and Photos 17 through 22 in Appendix A.

Recognized Environmental Conditions

Methodology

Prior to commencing fieldwork, HDR obtained an Environmental Data Resources Inc. (EDR) Report that lists REC sites within the overall Project study area (EDR, August 8, 2008¹). Based on information supplied in the EDR Report, HDR determined which sites had the potential of producing a moderate- or high-risk. During the field visit, HDR attempted to verify the location and source of EDR-listed REC sites that could provide exposure to a moderate- or high-risk. Photo documentation was applied.

Findings

The EDR Report lists one REC site, within the study area, that has the potential of exposing a moderate- or high-risk. This site is documented in Photos 22 through 24 in Appendix A and on Figure 12:

1. The EDR-listed REC site is noted as the “Ohiya Casino;” however, the EDR-mapped location of the site is not consistent with the actual Ohiya Casino location. EDR maps the site as occurring on (or near) N-12, east of the 531 Road intersection. The actual location of the Ohiya Casino is approximately 2,000 feet northwest of the mapped location. During the field verification, HDR noted nothing in the mapped location that appeared to present a potential REC. No structures or structure remnants were observed. The actual Ohiya Casino does have an associated fuel station and waste water treatment facility; however, no evidence of hazardous waste was observed.

¹ Environmental Data Resources Inc. August 8, 2008. EDR DataMap Environmental Analysis. N-12 Niobrara East and West. Inquiry Number: 02239000.1r.

Table 1: Wetland Field Verification					
Wetland ID ¹	Present (Y/N)	Size	NDOR/NWI Wetland Type ²	Modified Wetland Type ³	Dominant Vegetation
NDOR-1	Y	Correct	PEMA	--	reed canarygrass
NDOR-2	Y	Correct	PEMA	PSSA	willow
NDOR-3	Y	Correct	PFO/PSS	--	black willow
NDOR-4	Y	Correct	PEMA	--	reed canarygrass
NDOR-5	Y	Correct	PEMA	--	river bulrush
NDOR-6	Y	Correct	PEMA/PEMC	--	cattail, reed canarygrass
NDOR-7	N	Modified	--	UPL	brome
NDOR-8	Y	Correct	PEMA	--	reed canarygrass
NDOR-9	Y	Correct	PEMA	--	reed canarygrass
NDOR-10	Y	Correct	PEMC	--	cattail
NDOR-11	Y	Correct	PSS	PFO	willow, cottonwood
NDOR-12	Y	Modified	PEMA	PEMA/PFOA	cattail, cottonwood
NDOR-13	Y	Correct	PEMC	PEMA	reed canarygrass
NDOR-14	Y	Correct	PEMA	--	emergent mix
NDOR-15	Y	Correct	PEMA/PEMC	--	cattail
NDOR-16	Y	Correct	PEMC	--	cattail, common reed
NDOR-17	Y	Correct	PEMC	--	cattail
NDOR-18	Y	Modified	PEMA/FW	--	reed canarygrass
NDOR-19	Y	Correct	PEMC	PEMA	common reed, great ragweed
NDOR-20	Y	Correct	PEMC	PEMA	emergent mix
NDOR-21	Y	Correct	PEMA	--	reed canarygrass, smartweed
NDOR-22	Y	Correct	PEMA	PSSA	willow, cottonwood
NDOR-23	Y	Correct	PEMC	--	reed canarygrass, prairie cordgrass
NDOR-24	Y	Correct	PEMC	--	reed canarygrass, prairie cordgrass
NDOR-25	Y	Correct	PEMC	--	cattail, reed canarygrass
NDOR-26	N	Modified	PEMC	UPL	brome, foxtail
NDOR-27	N			UPL	foxtail
NDOR-28	Y			PEMA	prairie cordgrass
NDOR-29	Y	Correct	PEMC	--	cattail
NDOR-30	Y	Correct	PEMC	--	cattail
NDOR-31	Y	Correct	PEMC	--	cattail
NDOR-32	Y	Correct	PEMC	--	common reed, cattail
New-33	N/A	N/A	N/A	PEMA	spike rush
NDOR-34	Y	Correct	PEMC	--	cattail
NDOR-35	Y	Correct	PEMA	PEMC	cattail
NDOR-36	Y	Correct	PEMA	--	prairie cordgrass
NDOR-37	Y	Correct	PEMC	--	cattail
NDOR-38	Y	Correct	UPL	--	upland mix
NDOR-39	Y	Correct	PEMC	--	cattail
NDOR-40	Y	Correct	Open Water	--	N/A
NDOR-41	Y	Correct	PEMC	PEMF	cattail
NDOR-42	Y	Correct	Open Water	--	N/A
NDOR-43	Y	Correct	PEMC	PEMF	cattail
NDOR-44	Y	Correct	PEMA	--	reed canarygrass

Table 1: Wetland Field Verification					
Wetland ID ¹	Present (Y/N)	Size	NDOR/NWI Wetland Type ²	Modified Wetland Type ³	Dominant Vegetation
NDOR-45	Y	Correct	PEMC	--	cattail
NDOR-46	Y	Correct	PFOA	--	wet trees, reed canarygrass
NDOR-47	Y	Correct	PEMA	--	cattail, reed canarygrass
NDOR-48	Y	Correct	PEMC	--	cattail
NDOR-49	Y	Correct	PEMA	PFOA	wet trees, reed canarygrass
NDOR-50	Y	Correct	PEMC	--	cattail
NDOR-51	Y	Correct	PEMA	PFOA	cottonwood, reed canarygrass
NDOR-52	Y	Correct	PEMA/PFOA	--	wet trees, reed canarygrass
NDOR-53	Y	Correct	PEMA	--	reed canarygrass
NDOR-54	Y	Correct	PFOA	--	cottonwood, reed canarygrass
NDOR-55	Y	Correct	PFOA	--	cottonwood, reed canarygrass
NDOR-56	Y	Correct	PEMC	--	reed canarygrass
NDOR-57	Y	Correct	PEMC	--	reed canarygrass
NDOR-58	Y	Correct	PEMC	--	reed canarygrass
NDOR-59	Y	Correct	PEMC	PEMF	cattail
NDOR-60	Y	Correct	PEMC	PEMF	cattail
NDOR-61	Y	Correct	PEMC	PEMA	prairie cordgrass
NDOR-62	Y	Correct	PEMA	--	yellow foxtail
NDOR-63	Y	Correct	PEMA	--	yellow foxtail
NDOR-64	Y	Correct	PEMC	--	cattail
NDOR-65	Y	Correct	PEMC	PEMF	cattail
NDOR-66	Y	Correct	PEMC	--	cattail
NDOR-67	Y	Correct	PEMC	PEMF	cattail
NDOR-68	N	--	--	--	brome
NDOR-69	Y	Correct	PEMC	--	N/A: disturbed
NDOR-70	Y	Correct	PEMC	--	reed canarygrass
NDOR-71	Y	Correct	PFOA	--	willow, reed canarygrass
NDOR-72	Y	Correct	PEMA	--	reed canarygrass
NDOR-73	Y	Correct	PFOA	--	wet trees, reed canarygrass
NDOR-74	Y	Modified	PEMA	--	reed canarygrass
NDOR-75	Y	Correct	PEMA	--	reed canarygrass
NWI-76	N	--	--	--	brome
NWI-77	N	--	--	--	brome
New-78	Y	--	--	PEMA	cattail
NHD-79	N	--	--	UPL	dry channel
NHD-80	N	--	--	UPL	dry swale
NWI-81	Y	Modified	PABF	PEMA	cattail
NHD-82	Y	--	--	--	defined channel with no wetland fringe
NWI/NHD-83	Y	--	--	PEMA	cattail
NWI-84	Y	Correct	PABF	--	impounded pond
NWI/NHD-85	Y	Correct	PABF	PEMA	vegetated channel with ponds
NWI-86	Y	Correct	PABF	PEMA	cattail depression
NWI-87	N	--	PABF	UPL	breeched dam
NWI-88	Y	Correct	PABF	--	impounded pond
NWI-89	Y	Correct	PABF	--	impounded pond
NHD-90	Y	--	--	PEMA	cattail drainage

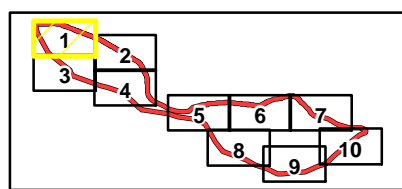
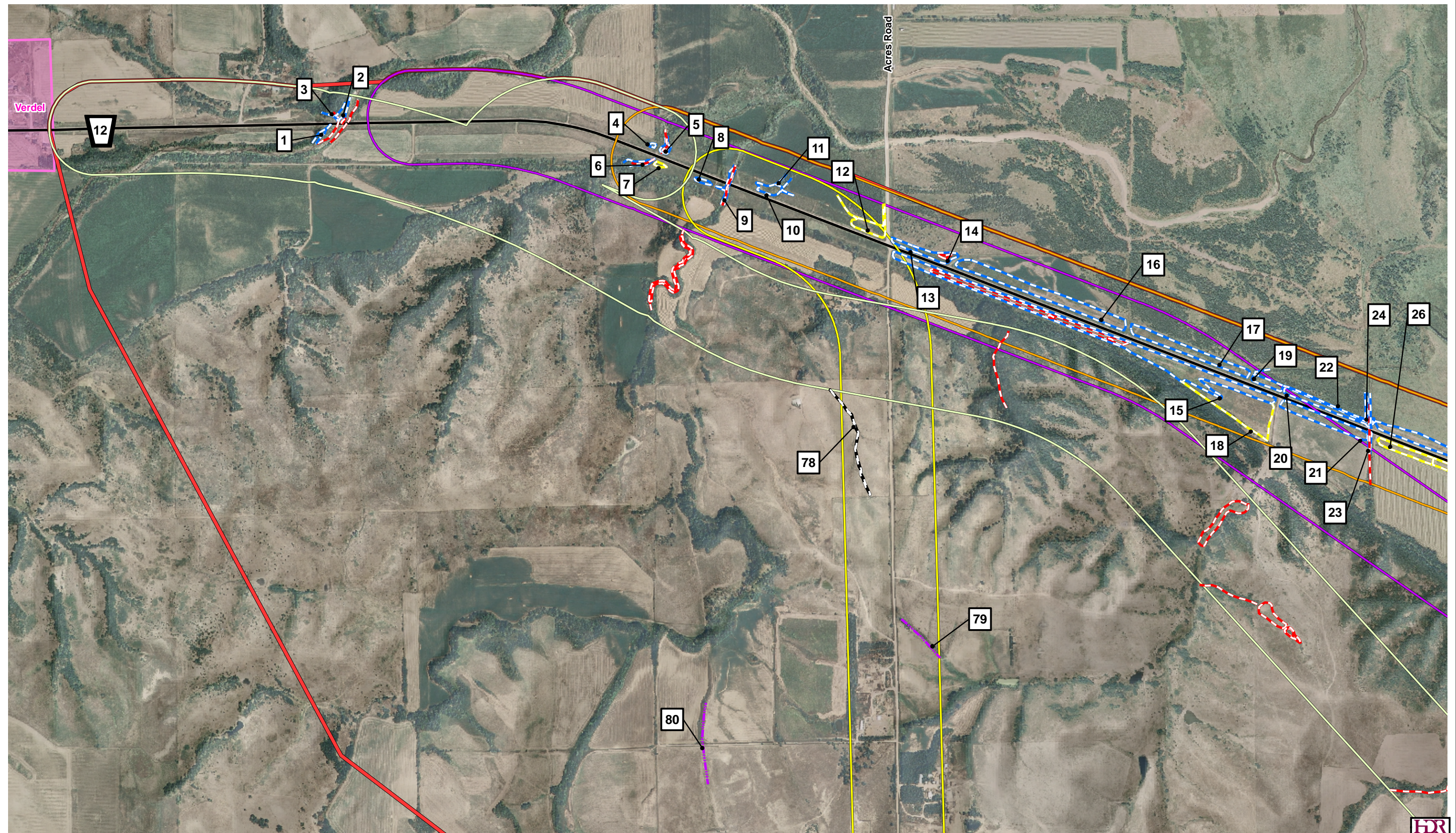
Table 1: Wetland Field Verification					
Wetland ID ¹	Present (Y/N)	Size	NDOR/NWI Wetland Type ²	Modified Wetland Type ³	Dominant Vegetation
NHD-91	Y	Correct	--	PEMA	cattail drainage
NWI-92	Y	--	PABF	--	impounded pond
NWI-93	Y	Correct	PABF	--	impounded pond
NWI-94	Y	Correct	PABF	--	impounded pond
NHD-95	Y	--	--	PEMA/PFOA	wet trees, reed canarygrass
NWI-96	Y	Correct	PABF	--	impounded pond
NWI-97	Y	Correct	PABF	--	impounded pond
New-98	Y	--	--	PFOA	wet trees, reed canarygrass
New-99	Y	--	--	--	pond
New-100	N	--	--	UPL	brome drainage
NHD-101	Y	--	--	PEMA	cattail, reed canarygrass
NHD-102	Y	--	--	PEMA	reed canarygrass
New-103	N	--	--	UPL	brome draw
NHD-104	Y	--	--	PEMA	cattail, bulrush
New-105	Y	--	--	--	pond
NHD-106	Y	--	--	PEMA	channel with wide PEMA fringe
New-107	Y	--	--	PEMA	emergent fringe of Bazile Creek
New-108	Y	--	--	PFOA	forested fringe of Bazile Creek
New-109	Y	--	--	PFOA	forested fringe of Bazile Creek

Notes:

¹ NHD = USGS National Hydrography Dataset

² FW = farmed wetland; PABF = palustrine aquatic bed semi-permanently flooded wetland; PEMA = palustrine emergent temporarily flooded wetland; PEMC = palustrine emergent seasonally flooded wetland; PFOA = palustrine forested temporarily flooded wetland; PSS = palustrine scrub-shrub wetland; UPL = upland (non-wetland).

³ PEMF = palustrine emergent semi-permanently flooded wetland; PSSA = palustrine scrub-shrub temporarily flooded wetland.



Aerial Imagery: 2006 NAIP, Knox County, Nebraska

Legend

- Nebraska Highway 12
- Study Area

Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands

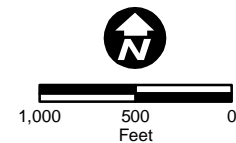
Status

- Modified
- New
- Verified
- Unverified

Not Present

Stream Verification

- Verified Stream
- Stream Not Present



Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement



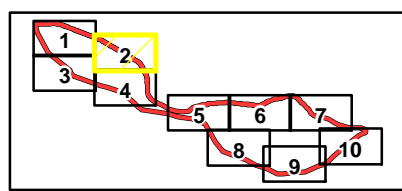
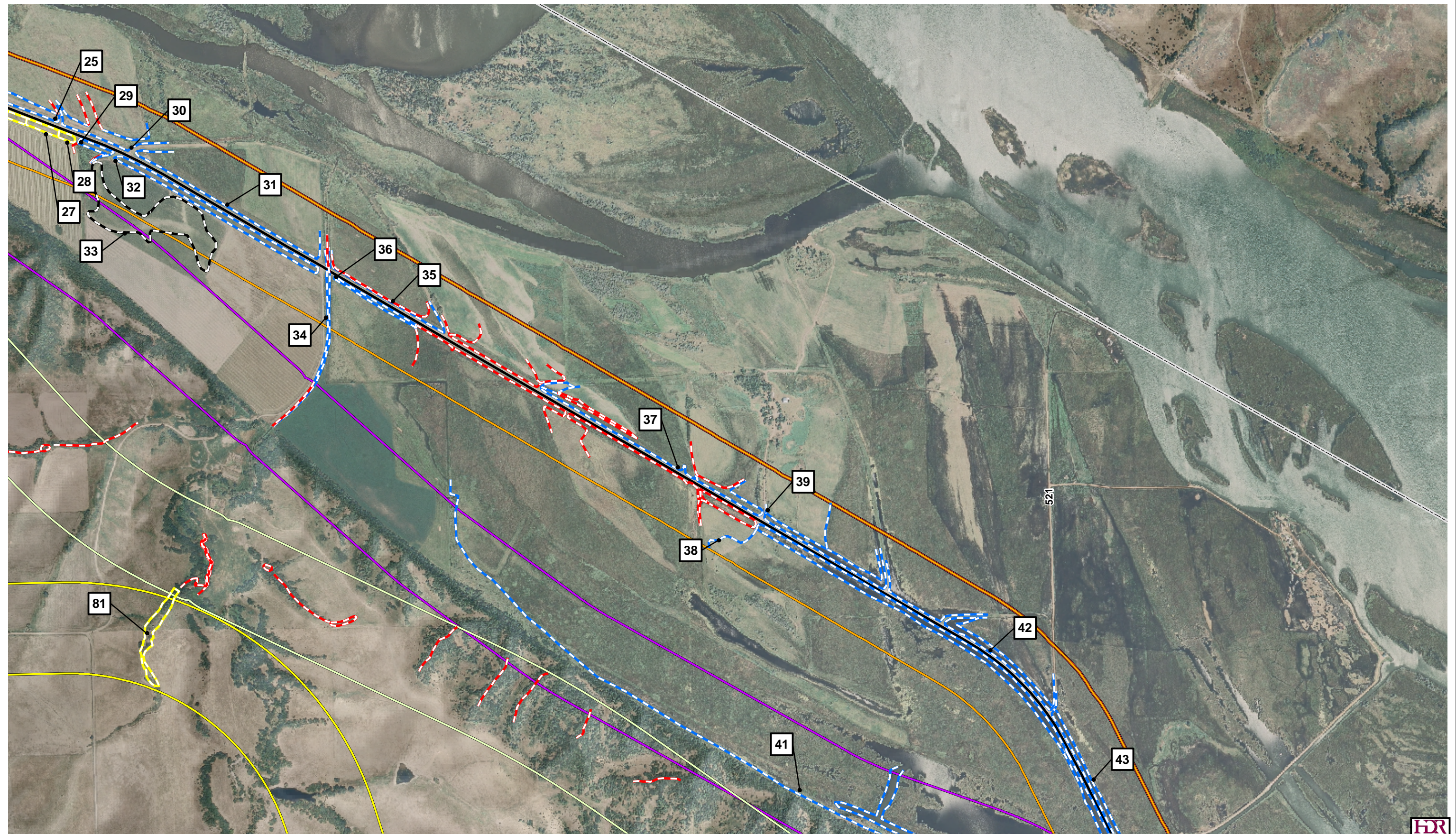
DATE

December 2008

FIGURE

1 of 10

HDR



Aerial Imagery: 2006 NAIP, Knox County, Nebraska

Legend

- Nebraska Highway 12
- Study Area

Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands

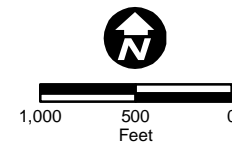
Status

- Modified
- New
- Verified
- Unverified

Not Present

Stream Verification

- Verified Stream
- Stream Not Present



Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement

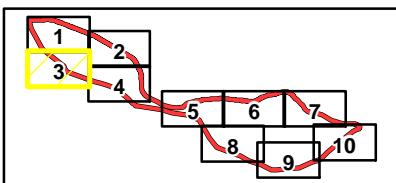
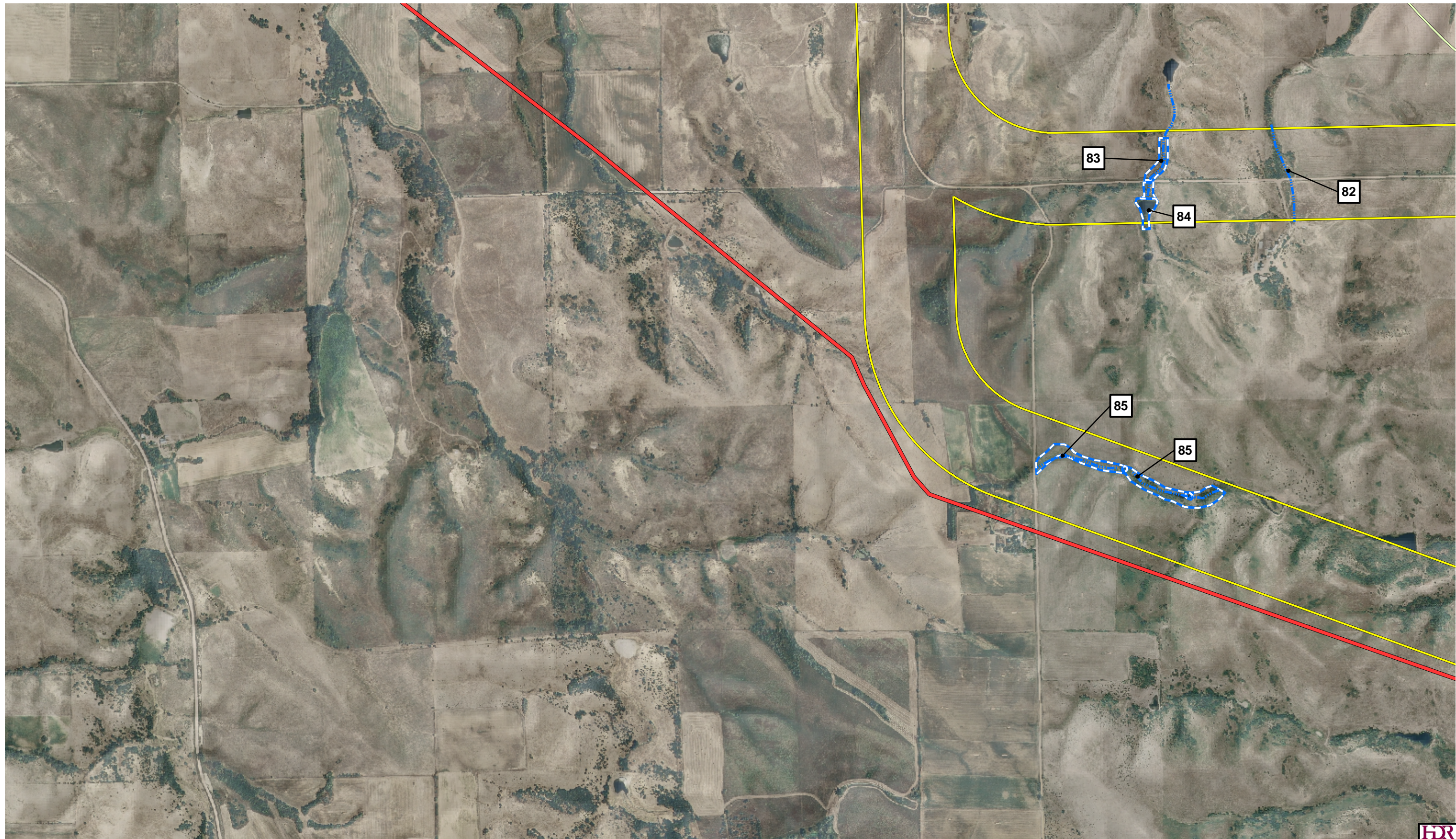


DATE

December 2008

FIGURE

2 of 10



Legend

- Nebraska Highway 12
- Study Area

Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands

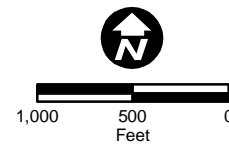
Status

- Modified
- New
- Verified
- Unverified

- Not Present

Stream Verification

- Verified Stream
- Stream Not Present



Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement

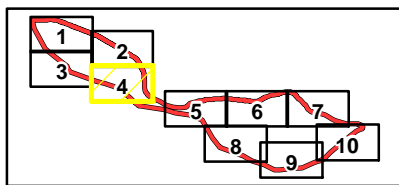
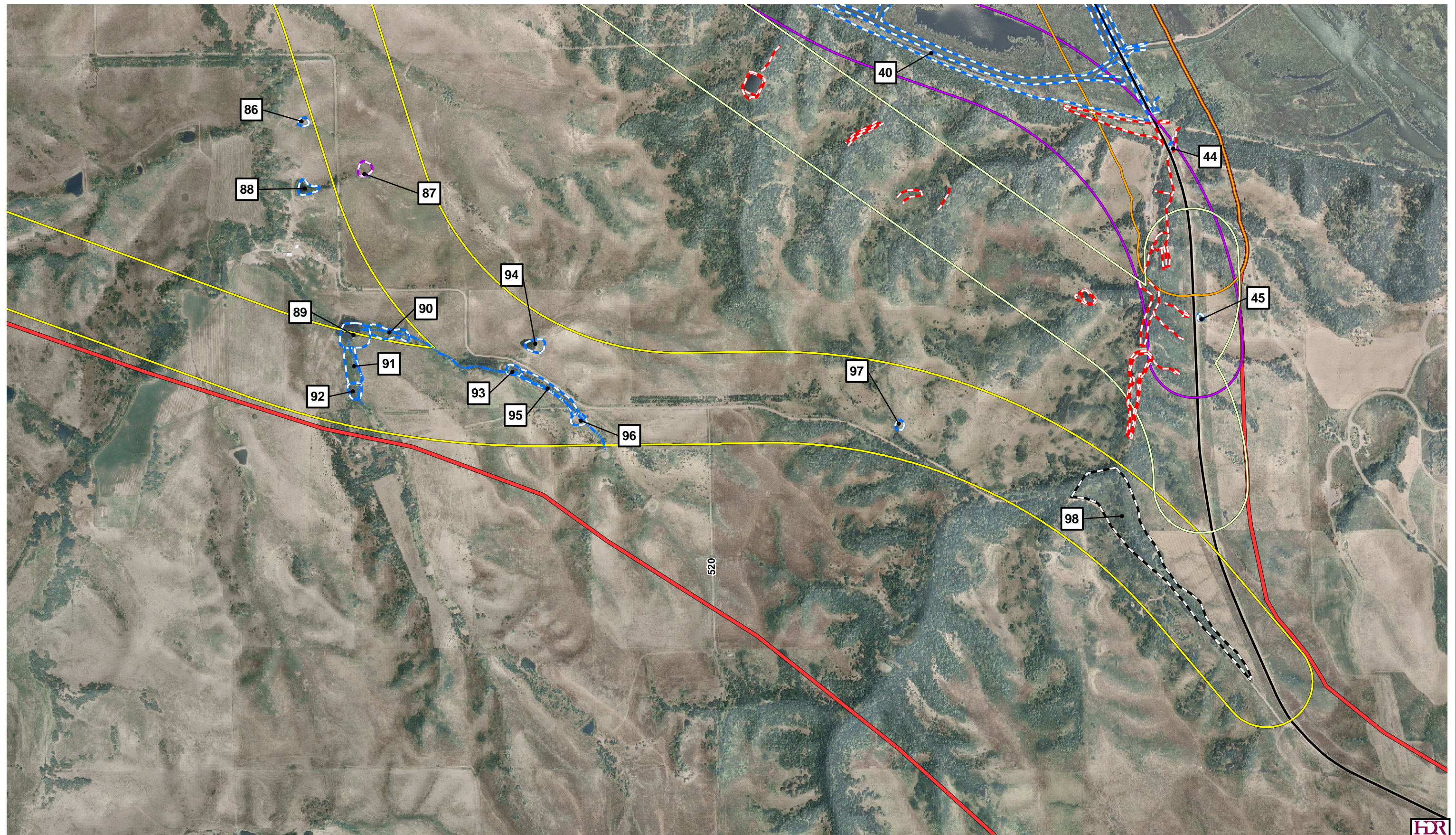


DATE

December 2008

FIGURE

3 of 10



Aerial Imagery: 2006 NAIP, Knox County, Nebraska

Legend

- Nebraska Highway 12
- Study Area

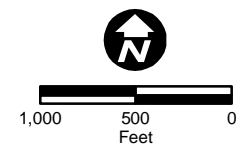
Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands Status

- Modified
- New
- Verified
- Unverified

- Not Present
- Stream Verification
- Verified Stream
- Stream Not Present



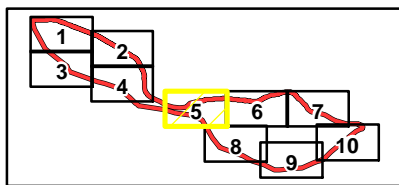
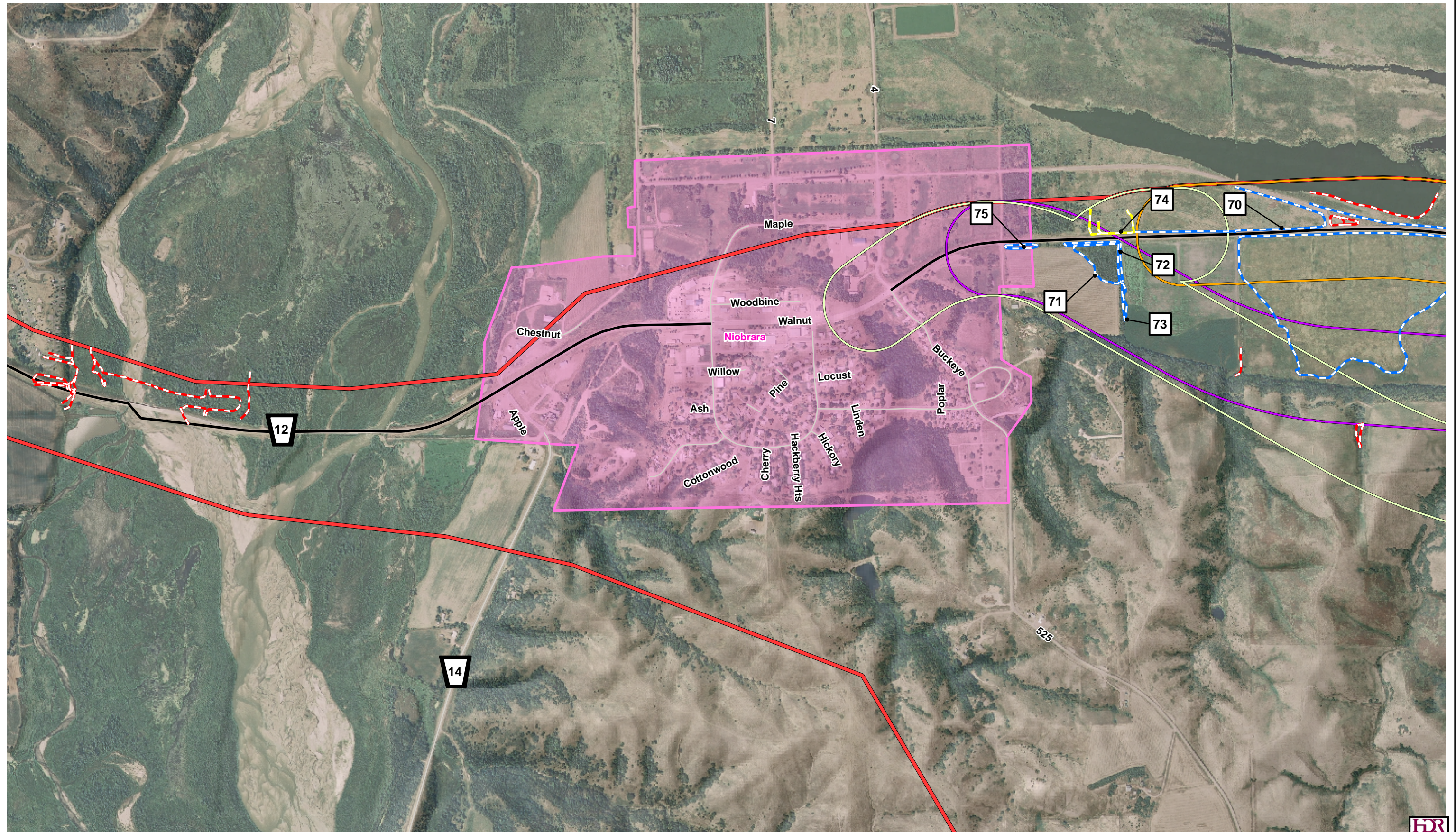
Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement



DATE
December 2008

FIGURE
4 of 10



Aerial Imagery: 2006 NAIP, Knox County, Nebraska

Legend

- Nebraska Highway 12
- Study Area

Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands

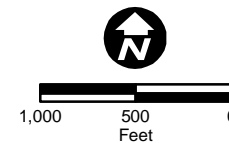
Status

- Modified
- New
- Verified
- Unverified

- Not Present

Stream Verification

- Verified Stream
- Stream Not Present



Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement



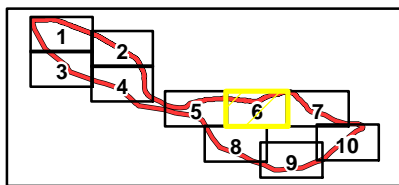
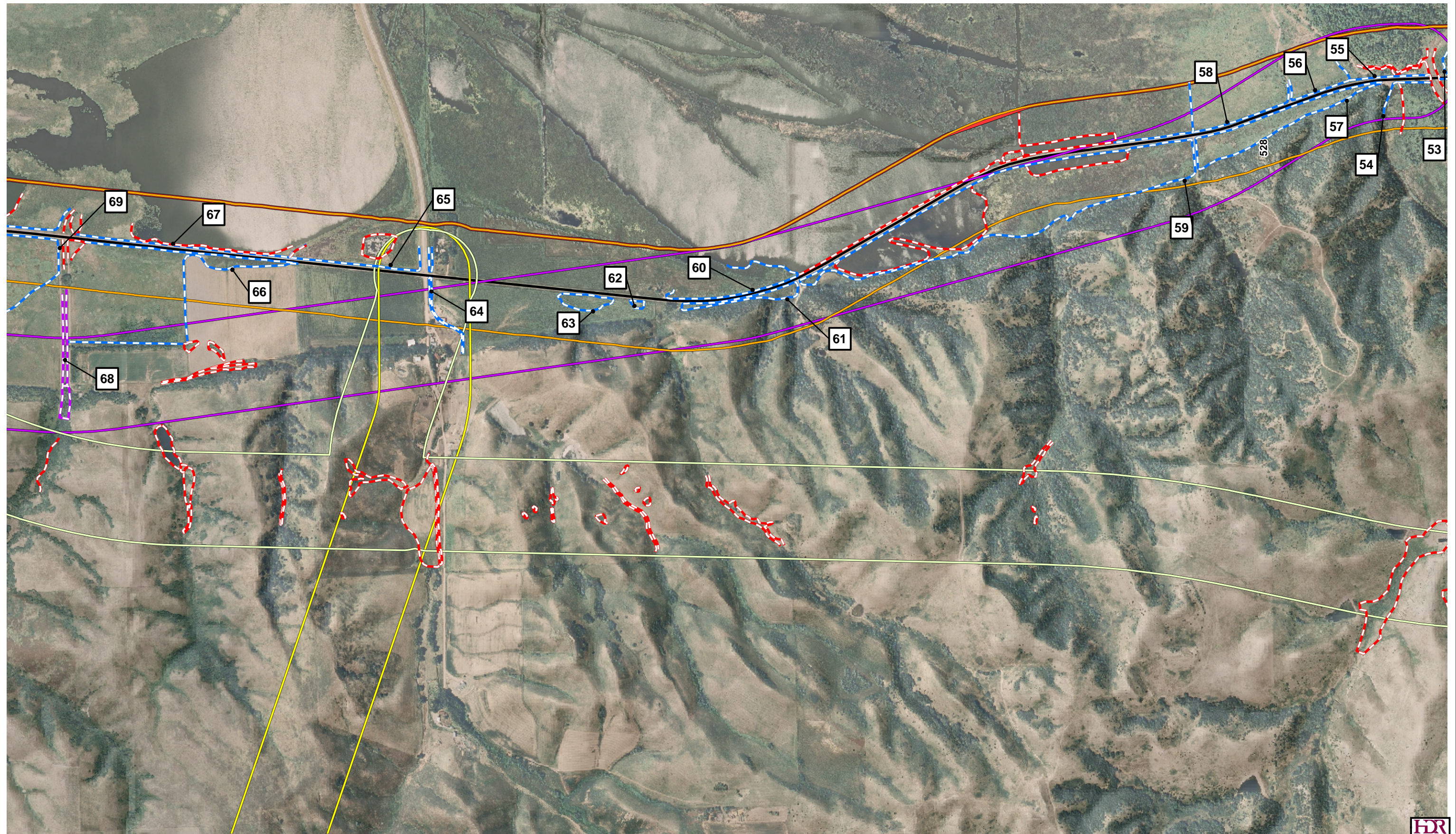
DATE

December 2008

FIGURE

5 of 10





Aerial Imagery: 2006 NAIP, Knox County, Nebraska

Legend

- Nebraska Highway 12
- Study Area

Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands

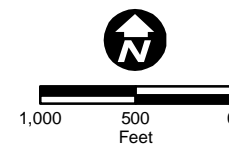
Status

- Modified
- New
- Verified
- Unverified

- Not Present

Stream Verification

- Verified Stream
- Stream Not Present



Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement

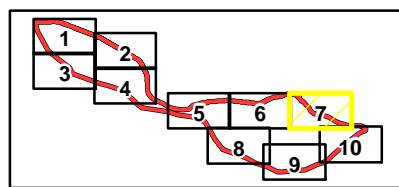
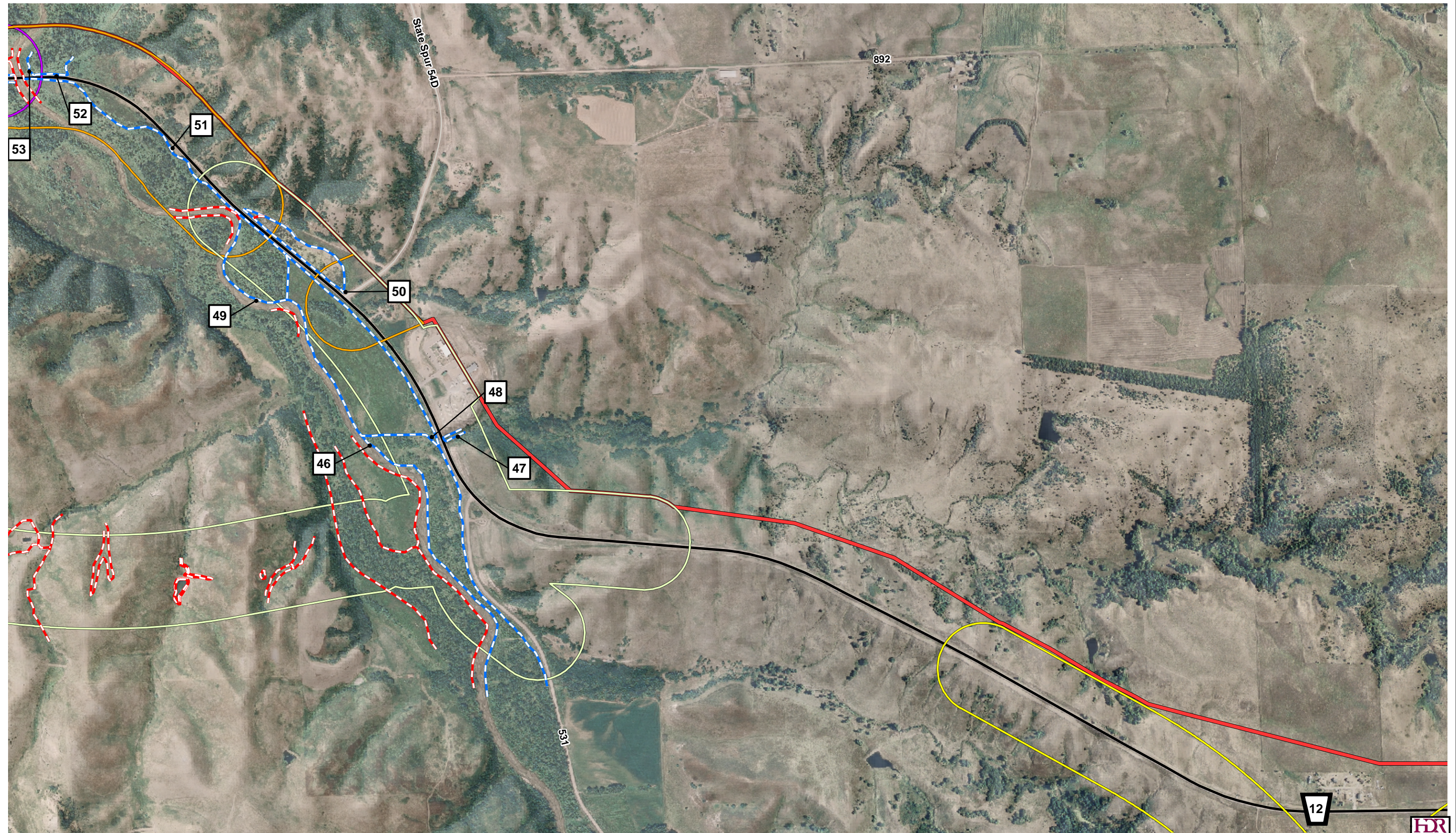


DATE

December 2008

FIGURE

6 of 10



Aerial Imagery: 2006 NAIP, Knox County, Nebraska

Legend

- Nebraska Highway 12
- Study Area

Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands

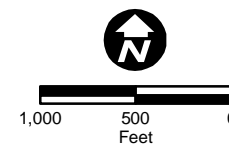
Status

- Modified
- New
- Verified
- Unverified

Stream Verification

- Verified Stream
- Stream Not Present

- Not Present



Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement



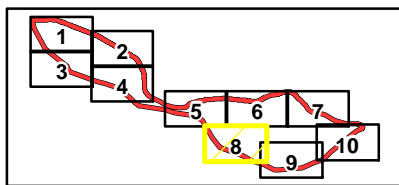
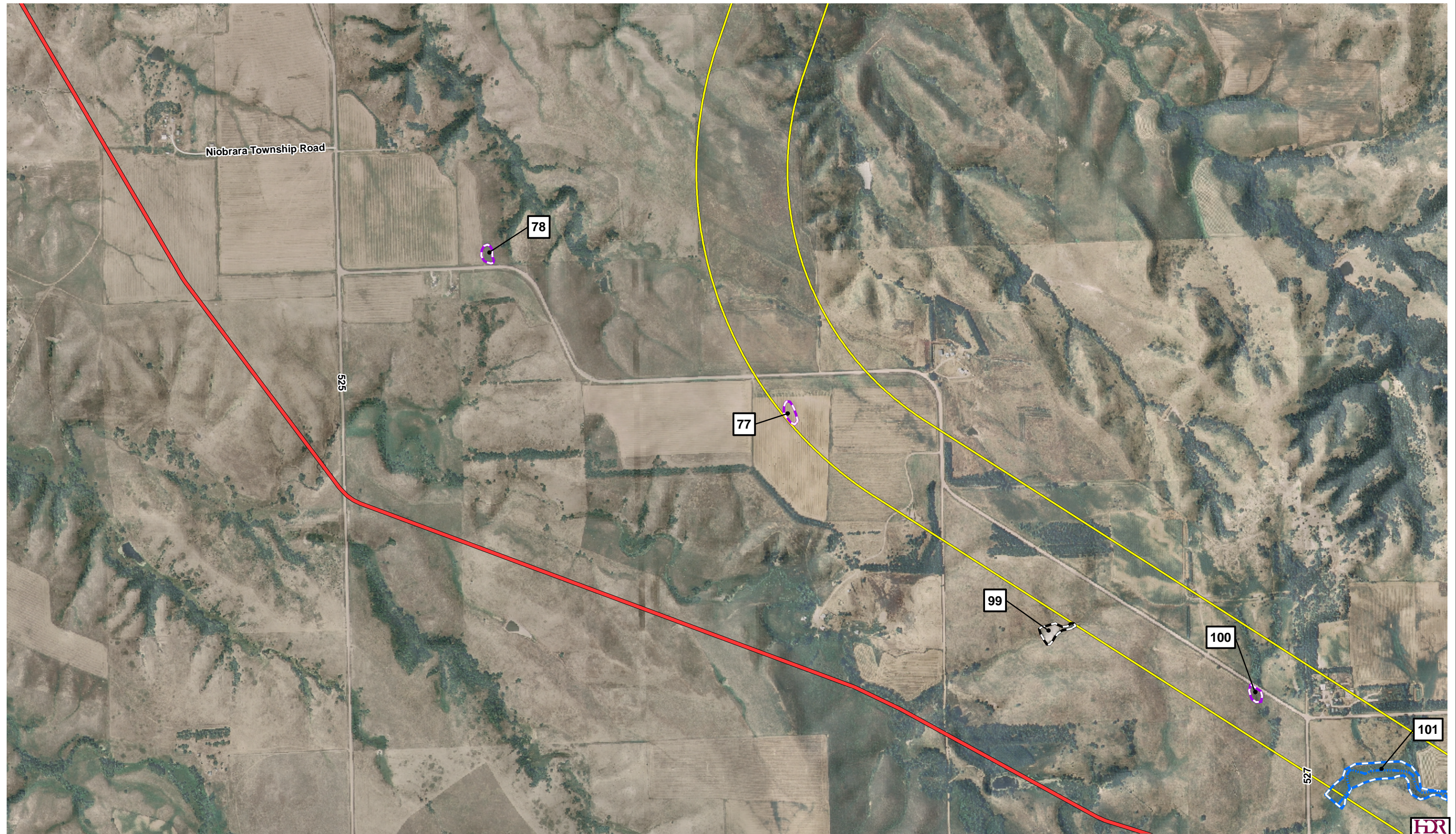
DATE

December 2008

FIGURE

7 of 10

HDR



Legend

- Nebraska Highway 12
- Study Area

Alternatives

- A1, A2, A3
- A4
- B1
- B-2

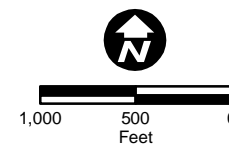
NDOR & NWI Verified Wetlands

Status

- Modified
- New
- Verified
- Unverified

Stream Verification

- Not Present
- Verified Stream
- Stream Not Present



Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement

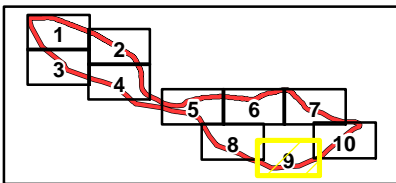
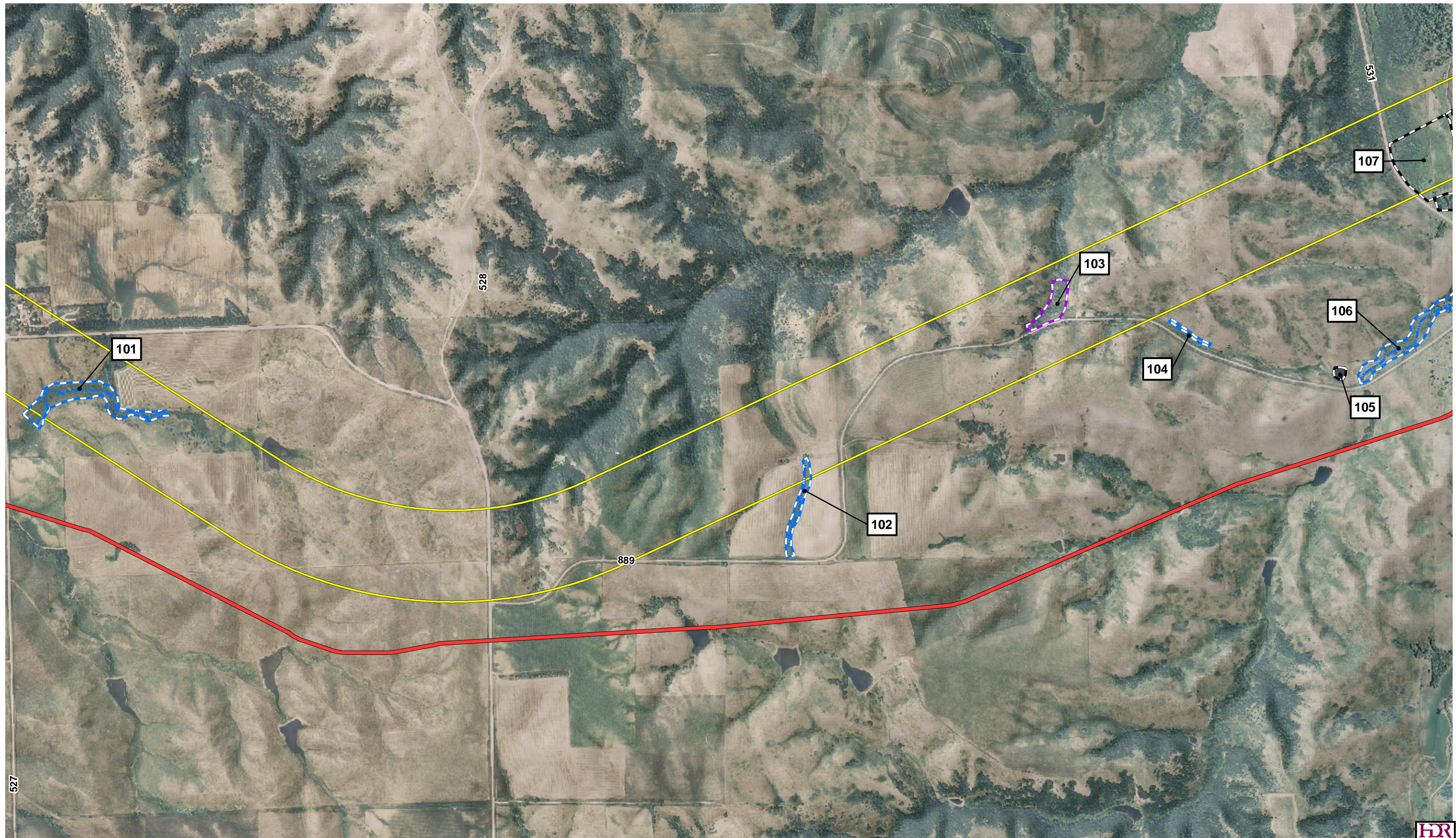


DATE

December 2008

FIGURE

8 of 10



Aerial Imagery: 2006 NAIP, Knox County, Nebraska

Legend

- Nebraska Highway 12
- Study Area

Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands

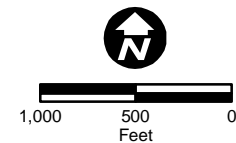
Status

- Modified
- New
- Verified
- Unverified

- Not Present

Stream Verification

- Verified Stream
- Stream Not Present



Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement

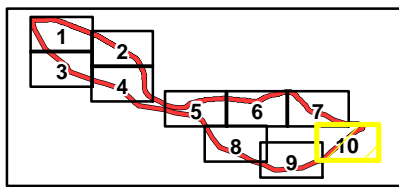
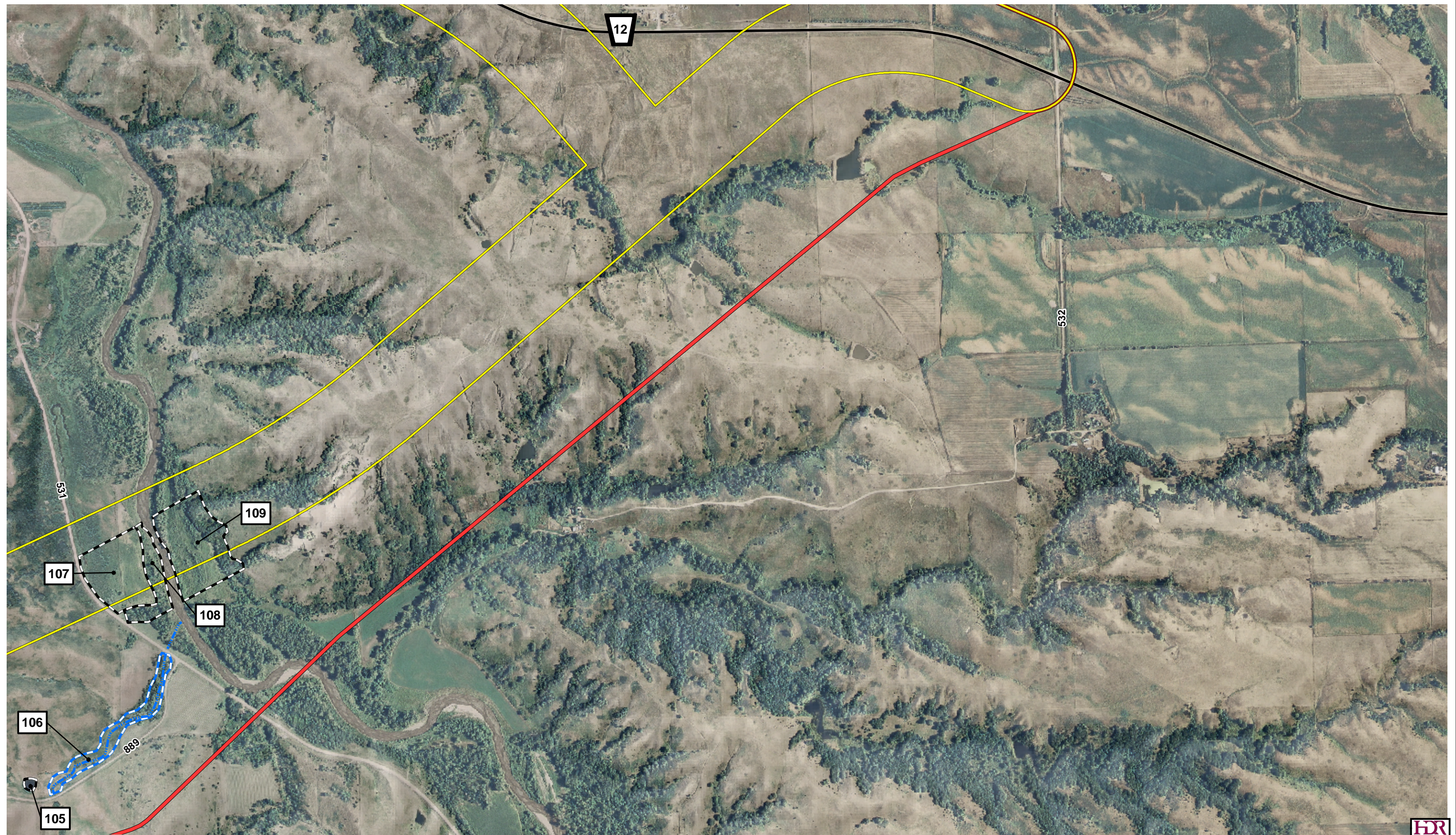


DATE

December 2008

FIGURE

9 of 10



Legend

- Nebraska Highway 12
- Study Area

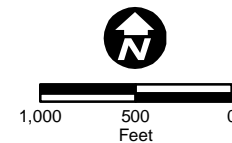
Alternatives

- A1,A2,A3
- A4
- B1
- B-2

NDOR & NWI Verified Wetlands Status

- Modified
- New
- Verified
- Unverified

- Not Present
- Stream Verification
- Verified Stream
- Stream Not Present



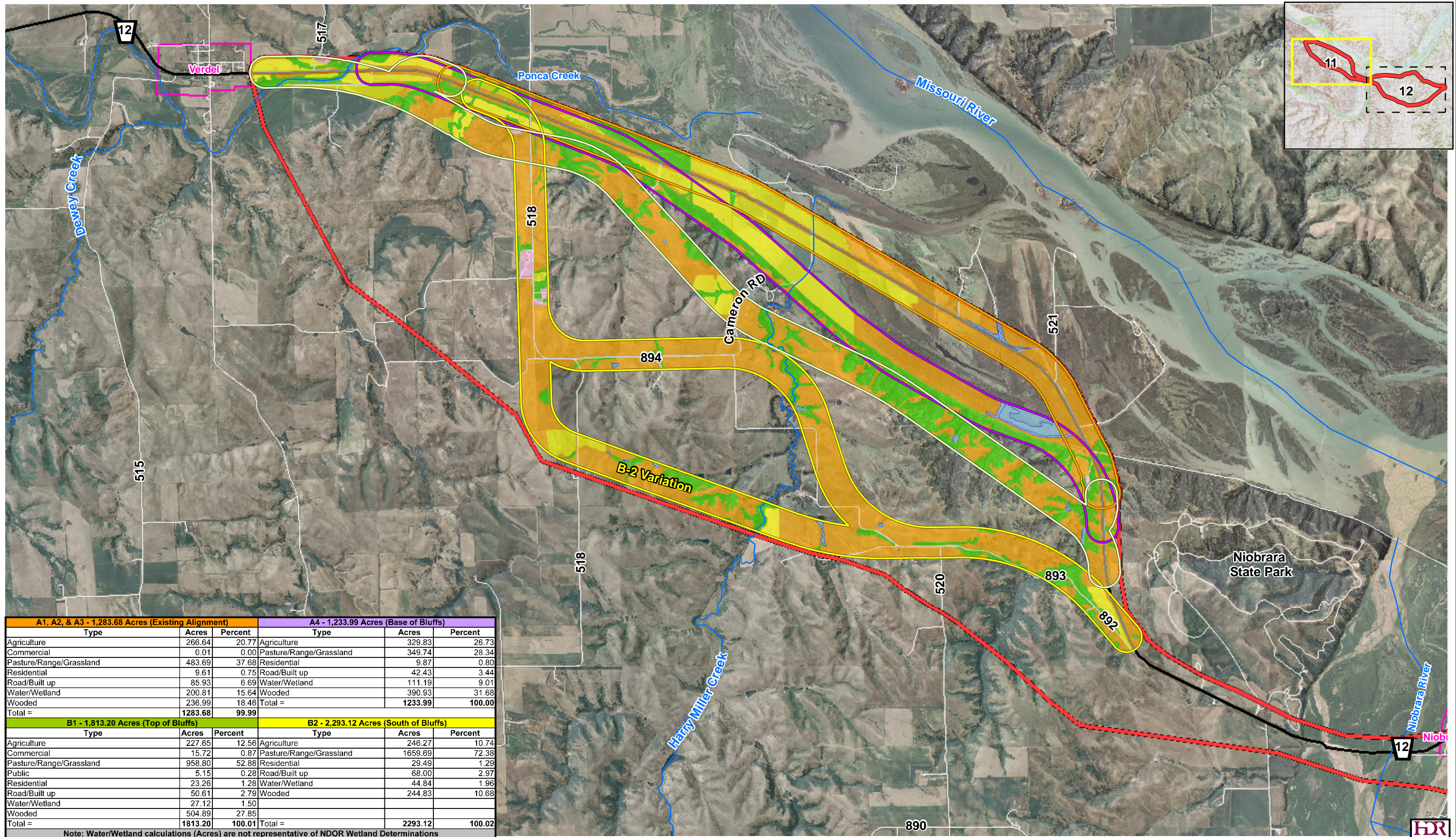
Wetland Field Verification

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement



DATE
December 2008

FIGURE
10 of 10



A1, A2, & A3 - 1,283.68 Acres (Existing Alignment)			A4 - 1,233.99 Acres (Base of Bluffs)		
Type	Acres	Percent	Type	Acres	Percent
Agriculture	266.64	20.77	Agriculture	329.83	26.73
Commercial	0.01	0.00	Pasture/Range/Grassland	349.74	28.34
Pasture/Range/Grassland	483.69	37.68	Residential	9.87	0.80
Residential	9.61	0.75	Road/Built up	42.43	3.44
Road/Built up	85.93	6.69	Water/Wetland	111.19	9.01
Water/Wetland	200.81	15.64	Wooded	390.93	31.68
Wooded	236.99	18.46	Total =	1233.99	100.00
Total =	1283.68	99.99			
B1 - 1,813.20 Acres (Top of Bluffs)			B2 - 2,293.12 Acres (South of Bluffs)		
Type	Acres	Percent	Type	Acres	Percent
Agriculture	227.65	12.56	Agriculture	246.27	10.74
Commercial	15.72	0.87	Pasture/Range/Grassland	1659.69	72.38
Pasture/Range/Grassland	958.80	52.88	Residential	29.49	1.29
Public	5.15	0.28	Road/Built up	68.00	2.97
Residential	23.26	1.28	Water/Wetland	44.84	1.96
Road/Built up	50.61	2.79	Wooded	244.83	10.68
Water/Wetland	27.12	1.50			
Wooded	504.89	27.85			
Total =	1813.20	100.01	Total =	2293.12	100.02

Note: Water/Wetland calculations (Acres) are not representative of NDOR Wetland Determinations



Aerial Imagery: 2006 NAIP, Knox County, Nebraska

Legend

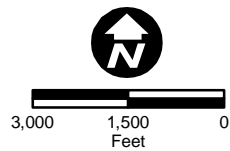
- Waterways
- Nebraska Highway 12
- City Limits
- Study Area

Alternatives

- A1, A2, & A3
- A4
- B1
- B-2

Land Use / Land Cover

- Type
- Agriculture
 - Commercial
 - Pasture/Range/Grassland
 - Public
 - Residential
 - Road/Built up
 - Water/Wetland
 - Wooded



Land Use / Land Cover

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement



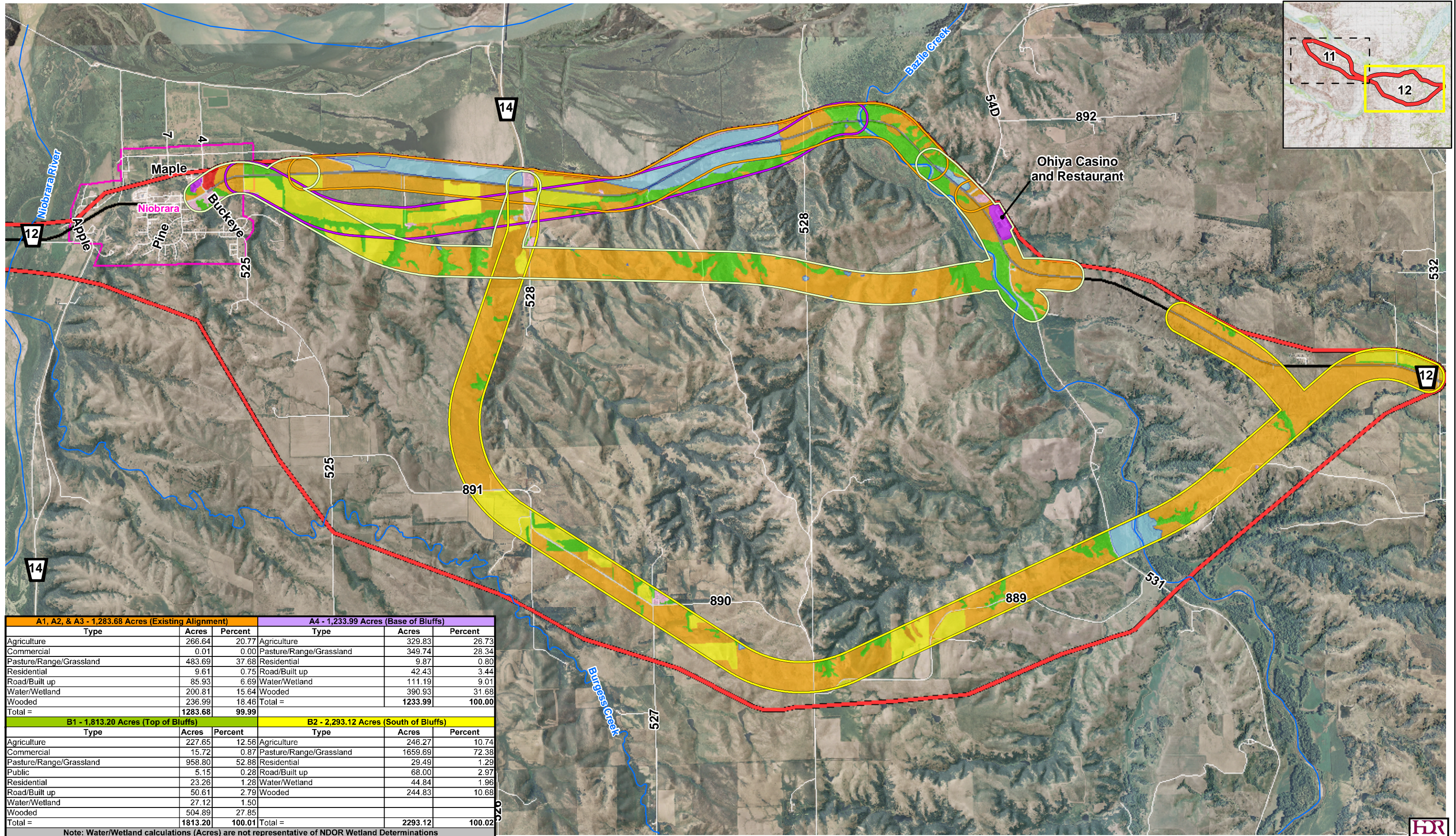
DATE

January 2009

FIGURE

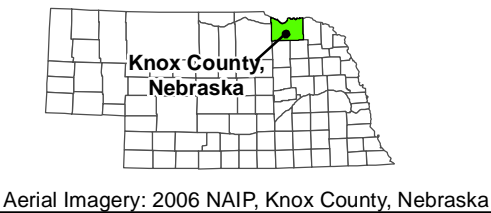
11

Sheet 1 of 2



A1, A2, & A3 - 1,283.68 Acres (Existing Alignment)			A4 - 1,233.99 Acres (Base of Bluffs)		
Type	Acres	Percent	Type	Acres	Percent
Agriculture	266.64	20.77	Agriculture	329.83	26.73
Commercial	0.01	0.00	Pasture/Range/Grassland	349.74	28.34
Pasture/Range/Grassland	483.69	37.68	Residential	9.87	0.80
Residential	9.61	0.75	Road/Built up	42.43	3.44
Road/Built up	85.93	6.69	Water/Wetland	111.19	9.01
Water/Wetland	200.81	15.64	Wooded	390.93	31.68
Wooded	236.99	18.46	Total =	1233.99	100.00
Total =	1283.68	99.99			
B1 - 1,813.20 Acres (Top of Bluffs)			B2 - 2,293.12 Acres (South of Bluffs)		
Type	Acres	Percent	Type	Acres	Percent
Agriculture	227.65	12.56	Agriculture	246.27	10.74
Commercial	15.72	0.87	Pasture/Range/Grassland	1659.69	72.38
Pasture/Range/Grassland	958.80	52.88	Residential	29.49	1.29
Public	5.15	0.28	Road/Built up	68.00	2.97
Residential	23.26	1.28	Water/Wetland	44.84	1.96
Road/Built up	50.61	2.79	Wooded	244.83	10.68
Water/Wetland	27.12	1.50			
Wooded	504.89	27.85			
Total =	1813.20	100.01	Total =	2293.12	100.02

Note: Water/Wetland calculations (Acres) are not representative of NDOR Wetland Determinations



Legend

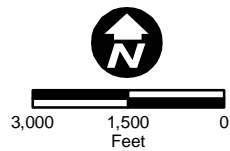
- Waterways
- Nebraska Highway 12
- City Limits
- Study Area

Alternatives

- A1, A2, & A3
- A4
- B1
- B-2

Land Use / Land Cover

- Type
- Agriculture
 - Commercial
 - Pasture/Range/Grassland
 - Public
 - Residential
 - Road/Built up
 - Water/Wetland
 - Wooded



Land Use / Land Cover

Nebraska State Highway 12
Knox County, Nebraska
Environmental Impact Statement



DATE
January 2009

FIGURE
12

Sheet 2 of 2

APPENDIX A

GROUND-LEVEL SITE PHOTOGRAPHY OF PREVIOUSLY UNEVALUATED SITES



Photo 1: ID New-33

Previously unidentified emergent wetland in field.

Orientation: southeast.



Photo 2: ID NWI-76

Dry brome field in location of NWI-mapped wetland.

Orientation: north.



Photo 3: ID NWI-77

Dry pasture in location of NWI-mapped wetland.

Orientation: west.



Photo 4: ID NHD-79

No channel or wetland in
NHD-mapped channel location.

Orientation: southeast.



Photo 5: ID NWI-81

NWI-mapped wetland and
cattail-dominated drainage
(in background) in pasture.

Orientation: east.



Photo 6: ID NWI/NHD-83

Cattail-dominated drainage.

Orientation: north.



Photo 7: ID NWI/NHD-85

Reed-canarygrass-dominated drainage.

Orientation: southeast.



Photo 8: ID NWI-86

Depression in pasture.

Orientation: west.



Photo 9: ID NWI-88

Pond in pasture.

Orientation: west.



Photo 10: ID NWI-89

Pond in pasture.

Orientation: west.



Photo 11: ID NWI-93

Open water along linear wetland drainage feature.

Orientation: south.



Photo 12: ID NWI-95 and NWI-96

Linear wetland drainage feature.

Orientation: northwest.



Photo 13: ID NHD-101

Linear wetland drainage feature.

Orientation: north.



Photo 14: ID NHD-102

Linear wetland drainage feature.

Orientation: west.



Photo 15: ID NHD-104

Linear wetland drainage feature.

Orientation: northeast.



Photo 16: ID New-107, New-108, New-109

Emergent and forested wetland areas adjacent to Bazile Creek.

Orientation: north.



Photo 17:

"Niobrara Outfitters" entrance off of N-12.

Orientation: north.



Photo 18:

Cameron Ranch entrance off of 894 Rd.

Orientation: south.



Photo 19:

Nielsen Ranch entrance off of 528 Ave.

Orientation: south.



Photo 20:

Mah-Ko-Chay Cabins entrance off of 525 Ave.

Orientation: south.



Photo 21:

New construction private cabin off of county road, east of 525 Ave.

Orientation: south.



Photo 22:

Ohiya Casino north of N-12 near State Spur 54D.

Orientation: north.



Photo 23:

Filling station at Ohiya Casino.

Orientation: northeast.



Photo 24:

Aboveground storage tanks behind the filling station at Ohiya Casino.

Orientation: north.